



## **WATER RESOURCES RESEARCH GRANT PROPOSAL**

**Title:** Information Dissemination and Technology Transfer Training Programs

**Principal Investigator:** Dr. Lois Wolfson, Institute of Water Research, Michigan State University, East Lansing, MI 48823

### **Project Relevance**

Michigan's water supply is abundant and widespread due in large part to Michigan's geographical location within the Upper Great Lakes Region. Michigan is surrounded by four of the five Great Lakes, and contains 11,000 inland lakes greater than 5 acres in size. Water flows through over 32,000 miles of river channel, and Michigan possesses a vast groundwater supply. These waters provide a wealth of resources for the diverse agricultural, industrial, and recreational opportunities of the state. However, the ever growing number of activities in the state continually add stress to this resource and can lead to further degradation of water. Because almost all wastes drain to the Great Lakes where the impact is accentuated due to the slow flushing rate of the system, water resource problems in the state are largely concerned with water quality issues.

As land use impacts that degrade water quality become more widespread, the need for action at the watershed level becomes more apparent. The movement of pollutants across a watershed is not constrained by political boundaries, and activities in one political jurisdiction may lead to water degradation in another. The difficulty in assessing impacts from erosion, nonpoint source pollution or shoreline development lies not only in the magnitude of the data collection efforts, but in the proper analysis and interpretation of the data needed for assessing the problem.

In order to stay informed of water quality changes over time, and to determine if efforts being made to reduce pollutants are proving effective, an education and monitoring program is appropriate. An effective information dissemination and training program would facilitate the transfer of information needed to protect the water resources in the state, and help to inform scientists, legislators, and citizens of the most recent information available. However, for further effectiveness, agency personnel, riparians, educators and others interested in protecting their water resources or in teaching others about it must understand the importance of collecting and/or analyzing information at the watershed level to ensure that reliable and appropriate information is being used to make sound decisions for water quality protection.

### **Project Objectives**

The Institute of Water Research has a long history of providing effective information dissemination and training programs. These programs have involved close cooperation with other groups and organizations within the University and the state in order to enhance their effectiveness. Because educational levels and prior knowledge in the subject area are so varied, a number of transfer mechanisms are necessary. These range from the direct dissemination of brochures, pamphlets, and technical and nontechnical books to computer models, the publication of technical completion reports, and videos, conference and seminars for both lay audiences and professional groups throughout the state. Training sessions on water-related topics, such as lake eutrophication, nonpoint

source pollution, and stream monitoring, provide hands-on experience for a number of diverse audiences.

The following objectives relate to information dissemination programs arising from water related activities at the Institute of Water Research .

1. Develop and present educational programs such as conferences, seminars, and training workshops designed to increase the public's awareness and appreciation of the water quality problems in the state and to stress the economic trade offs required to solve any problem.
2. Review, edit, and publish the water conferences and workshop proceedings.
3. Prepare lecture/demonstrations and audio visual materials for presentations to college classes, secondary and elementary schools, and private groups on such topics as watershed management, wastewater treatment, wetland and lake ecology, water conservation, and groundwater contamination.
4. Utilize the dissemination potential of the Worldwide Web by developing educational modules; interactive models; and virtual reality courses.
5. Cooperate with the Michigan State University Extension Service to make water related information available through the county cooperative extension agents.

### **Description of the Project**

The Institute of Water Research Technology Transfer and Information Dissemination Program began in the early 1970s, and has been expanded and improved to be more responsive to the informational needs of a wide variety of user groups. In order to promote the maximum exchange of information, the combination conference/workshop format has often been selected as the most versatile for scientific/researcher oriented groups. Such conferences are open to public participation. However, generally the workshop segment is set apart for the speakers and invited experts to synthesize the data and information into a state-of-the-art summary and/or recommendations document.

#### *Conferences*

Three conferences are planned for FY00. A Great Lakes Conference, a watershed management conference, and an inland lakes conference will each focus on the most recent information with respect to these subject areas. Current legislation; funding opportunities; approaching problems on a watershed basis; the role of individuals in addressing community concerns; safety and drinking water issues; and environmental risks are focus areas for these conferences.

#### *River Water Quality Monitoring and Training*

A major effort for this fiscal year will be the development of a stream monitoring program. The program will utilize a combination of land use data and physical, chemical, and biological instream data, to provide a means to educate citizens on water flow throughout the hydrologic cycle, assess water quality over time and determine if implemented local land use practices are helping to reduce nonpoint source input to receiving streams.

A multi-phased training program and field course will be held to provide participants with information and hands-on experience for macroinvertebrate and water chemistry sampling and analysis in riverine systems. The selected areas of monitoring will be contingent on those participating in the course; however, a portion of the monitoring will occur in the Dowagiac River, located within one of the top priority watersheds in the state. The training session will begin with an introduction as to the importance of using a

watershed approach to deal with any land use and water quality problem. Discussion will focus on the history of the area, past and current land use practices, background monitoring, key measurements that should be taken to identify a problem or evaluate a land use practice, and how to plan and carry out a project. Included in this process will be a short history of identified problems within the area, historical and recently collected data, and watershed characteristics, such as the geology of the area, topography, the location and extent of various land uses, soils, other water bodies, and the drainage area. Aerial photographs, maps, and data obtained from various sources will be used to augment existing information, and simple geographic information systems will be employed to illustrate important concepts such as aquifer vulnerability and land use impacts.

The course will explore when and where data should be collected, how it should be collected, simple and complex methods that can be used, selection of sampling locations, equipment that should be used and proper procedures for its use.

The second portion of the training program will be devoted to field sampling, analysis, and evaluation. Physical, chemical, and biological sampling methods will be taught. Included will be demonstrations and hands-on experience with weir installation, stream flow measurements, and macroinvertebrate sampling, handling, and identification. Collection and identification of these biological organisms in streams and their role and importance will also be stressed. Chemical measurements will include suspended solids, dissolved oxygen, and pH. Using various methodologies for interpreting water quality, assessments will be made concerning water quality in selected river reaches.

Many of the targeted participants have already expressed an interest and need in this training. The Michigan Lake and Stream Associations, Inc., a riparian group representing the majority of Lake Associations within the state have volunteered to assist with the promotion for this training and be active participants. School groups from the Dowagiac River Watershed area have also expressed an interest in participating in the river water quality monitoring.

#### *Demonstrations and Exhibits*

The Institute will participate in 4-H Exploration Days in cooperation with Michigan State University Extension. The topic for the Institute sponsored event will be Wet, Wild, Wonderful, and will feature aquatic plant and animal identification, water chemistry, and fisheries management. The Institute will also present an educational interactive exhibit during MSU's Ag Expo, an agricultural oriented exposition. The three day demonstration will focus on watershed management and the effects of land use practices on water quality. Approximately 3000 people are expected to attend this annual outdoor exhibit. The Institute also will again serve as the State Supervisor for Water Quality in the state finals for the Michigan Science Olympiad. This annual event attracts nearly 100 junior high and high schools across the state who compete in a variety of science related events. Winners of the event continue to the national finals.

#### *Personnel and Facilities*

The Institute of Water Research maintains or has at its disposal such facilities and equipment as word processing, drafting, taping, transcribing, video editing and photographic equipment to support its Information Dissemination Program. It also has microcomputers, three Sun Sparc-20 work station, several 3-D, graphics, draw, and

animation software packages, a graphic plotter, scanner, color printer and digitizer to enhance its educational programs.

In addition, the Institute of Water Research operates the Inland Lakes Research and Study Center (ILRSC) at Michigan State University. Located four miles south of the main campus, the ILRSC consists of a 200 acre fenced site with four manmade, shallow enriched lakes that average six feet in depth and total 40 surface acres. In addition to the four lakes, three artificial one acre marshes are located at the ILRSC. They are tiered to a depth of three feet, lined with two feet of native clay, and have a typical complex of marsh vegetation. The four lakes and three marshes provide a diverse array of aquatic habitats and an opportunity for whole lake studies and demonstrations. The 160 acres surrounding the lakes can be utilized for terrestrial studies.

The conference/workshop facilities of the Center include an indoor demonstration/lecture room. Concrete boat launching ramps provide convenient access to each lake. The ILRSC is open for tours and workshops from April through October. Elementary, high school and college classes continually take advantage of the outdoor facility by holding classes there. IWR staff hold combination lectures and workshops, and cover a variety of water related topics.

The Institute's technology transfer program is under the direction of Principal Investigator(s) Dr. Lois G. Wolfson, with several Institute personnel contributing to the project, including Dr. Frank D'Itri, Ruth Kline-Robach, Elaine Brown, and Joseph Ervin.